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PATENT APPLICATION
Docket No. 16785.1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:		)
		)
Applicant:	SCHERMANZ ET AL.	)
		)
Title:	EXHAUST GAS CATALYST COMPOSITION	) Art Unit
		) 4181
Serial No.:	10/595,795	)
		)
Filed:	August 15, 2006	)
		)
Confirmation No.:	6850	)
		)
Examiner:	DARJI, PRITESH D	)
		)

DECLARATION OF DR. KARL SCHERMANZ UNDER 37 C.F.R. & 1.132

Mail Stop AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

I hereby declare as follows:

1. I am personally knowledgeable of the facts stated herein.

2. I am an inventor of U.S. Patent Application Serial No. 10/595,795 ("Subject Application"), and thereby have a personal interest in the Subject Application.

3. I have significant experience in the art of NOx catalysts and method of preparation as applied in the Subject Application which is currently under examination. (*see* Appendix A: Curriculum Vitae of Dr. Karl Schermanz).

4. I have reviewed and understand the Subject Application and the Kleemann and Reddy references.

5. In the Office Action of the US patent office dated 01/21/10, claims 21 - 24 have been rejected as being unpatentable over the combined disclosure of Kleemann at al. "Investigation of the ammonia adsorption on monolithic SCR catalysts by transient response analysis" in Applied Catalysis B, Environmental 27 (2000) 231 - 242 and Reddy et al. "Surface characterization of CeO2/SiO2 and V2O5/ceO2/SiO2 Catalysts by Raman, XPS and other Techniques" in J. Phys. Chem.B 2002, 106, 10964 -10972.

6. The Office Action alleges that it would have been obvious for a person with ordinary skill in the art at the time of the invention to use the process of Kleemann including using Vanadium oxide with NH4VO3 and aqueous acid in view of Reddy to make the catalyst which includes CeVO4.

7. Experiments were conducted in order to determine whether or not the suggested combination of Kleemann and Reddy would lead to a Cerium-Vanadate (CeVO4) containing material as claimed in the present patent application. The experimentally derived data shows that it is not combination of Kleemann and Reddy does not lead to CeVO4.

8. In a first experiment, a CeO2/SiO2 component (molar ratio CeO2/SiO2 = 1:1) was prepared according to the description disclosed by Reddy. The CeO2/SiO2 support material was brought into contact with a powder of TiO2 (Anatas) and WO3 in aqueous suspension according to the description disclosed by Kleemann. The mixture (e.g., a result by combining the teaching or Kleemann and Reddy) brought to dryness and calcined to yield a TiO2/WO3/SiO2/CeO2 mixture.

9. On impregnation of the TiO2/WO3/SiO2/CeO2 mixed oxide with a vanadyloxalate solution, evaporation to dryness and calcination of the mixture at 700°C/ 5hrs yielded a vanadium and oxide mixture. However, the XRD-spectra is complex due to the signals caused by the different oxides, **but the XRD-spectra DOES NOT INDICATE** the presence of cerium

vanadate. The absence of the strong signals which should appear at least at 2 Theta degrees at 24.03, 49.24 shows that cerium vanadate (CeVO4) is not present. See Graphs 1 and 2 of Appendix B filed herewith. Graph 1 shows there is no CeVO4 when Reddy an Kleemann are combined. Graph 2 shows what a XRD-spectra should look like when CeVO4 is present. Thus, the combination of Kleeman and Reddy does not result in CeVO4, as evidenced by Graph 1.

10. In a second experiment, when 8.4% CeVO4 is mixed physically into the composition prepared in the first experiment relevant signals attributed to Cerium Vanadate at 2 Theta degrees at 18.12, 24.03, 49.24, 77.3 could be identified, as shown in Graph 2. Thus, had the first experiment resulted in CeVO4, Graph 1 would have had the CeVO4 peaks shown in Graph 2. This confirms that combining Reddy and Kleemann does not result in the presently claimed invention.

11. From the experiments carried out shown in Appendix B, I conclude that by combination of the processes of Kleemann and Reddy, it is not possible to yield rare earth-vanadate compositions such as disclosed and claimed in the present patent application.

12. Furthermore, I attest that Kleemann and Reddy are so different in their teachings that no skilled artisan would combine Kleemann and Reddy. Even if combined, Kleemann and Reddy still do not result in the presently claimed invention.

13. I declare further that all statements made herein of our own knowledge are true and that all statements are made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful, false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful, false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed this 13th day of May, 2010.

Dr. Karl Schermanz

APPENDIX A

CURRICULUM VITAE

Personal data:

Name: Karl Schermanz

Born: September 30, 1954 in Klagenfurt, Austria

Nationality: Austrian

Marital status: Married

Education and academic degrees:

1972 (23.06.) **Abitur (Matura)** 2. Bundesgymnasium, Klagenfurt, Austria

1979 **Magister Pharmaciae** (Mag. pharm.), University of Graz, Austria

1983 **Doctor rerum naturalium (Dr. rer. nat.)** in pharmaceutical chemistry, University of Graz (with distinction "summa cum laude")

Training courses with relevance to automotive exhaust gas after treatment:

4. FAD Conference, Dresden 2006
SCR-System, Car Training Institute, Forum 9 – 10 May 2007, Stuttgart (Germany)
SCR-System, Seminar 8 – 10 April 2008, Bonn (Germany)

Regular academic positions:

01.01.1980 - 31.12.1983 Scientific Assistant, Institute of Pharmaceutical Chemistry, University of Graz (chair Prof. Dr. G. Zigeuner)

01.01.1984 - 30.09.1989 Research Chemist at chemical company "CHEMIE LINZ

	AG", Linz , Austria
Since 01.10.1989	**Employee of Treibacher Industrie AG and in its subsidiary "Treibacher Auermet "in different positions:**
1989 - 1990	Head of R&D department "Chemical process development"
1991 -1994/6	Head of R&D department „Rare Earth Chemistry"
1994/7 – 1996	Plant Manager of „Rare Earth" in Treibacher Auermet
1997 – 2002/6	Head of R&D in Treibacher Auermet
Since 2002/7	Head of R&D department "Rare Earth Chemistry" in Treibacher Industrie AG

Research experience:

- Organic chemistry:
  Synthesis of active ingredients applicable as pharmaceuticals and phytopharmaceuticals (at University Graz and Chemie Linz)
- **Inorganic Chemistry with emphasize on Rare Earths:**
  Synthesis of mainly functional materials based on Rare Earths and Vanadium for application in the fields of **catalysis**, glass and ceramics, pharmaceuticals.

Overview on Publications

Organic Chemistry

More than 30 patents, patent applications and scientific papers in synthesis of organic materials (out of work at University Graz and Chemie Linz)

Inorganic Chemistry

Several patents and patent applications in fields of Rare Earths

Publications with relevance to Rare Earths and Catalyst Applications:

Articles, Scientific Books:

Seltene Erden (Rare Earths)
Herfried Richter, **Karl Schermanz**
Aktualisierung des Beitrags aus der 4. Auflage (actualisation of chapter Rare Earths) in
Winnacker-Küchler: Chemische Technik
Prozesse und Produkte. Band 6B: Metalle
Winnacker, Chemische Technik (Volume 6b)

Co-Autor of **„Catalysis by Ceria and Related Materials"** (edited by A. Trovarelli) Imperial College Press, 2002;

Publications

M. Casanova, A. Trovarelli, Università di Udine/I; **K. Schermanz, Treibacher Industrie**, Althofen/A; I. Begsteiger, Frauental GmbH, Frauental/A **"Activity and high-temperature stability of SCR catalysts modified with rare-earths" 4th International Conference on Environmental Catalysis (Heidelberg, 2005)**
K. Schermanz, Treibacher Industrie AG, „High-temperature Stability of SCR Catalysts Modified with Rare –earths Rare Earth 04; Nara , Japan 2004

APPENDIX B

Experimental:

1. Preparation of CeO2/SiO2 according to J.Phys. Chem. B, Vol. 106, No. 42, 2002 page 10965 (Procedure 1)

35.86 g of Cerium Ammonium Nitrate (CeO2 content = 31%) corresponding to 11.12 g (0.0646 Mol) CeO2 were dissolved in 150 mL of deionized water and the mixture obtained was mixed with 12.94 g of colloidal silica (SiO2 content = 30%) corresponding to 3.88 g (0.0646 Mol) SiO2.

The solution obtained was subjected to precipitation of the Ce by adding 12% ammonia till a pH of 8 was adjusted. The resulting precipitate was filtered off, washed with deionized water, and dried in oven at 110°C for 12h followed by calcination at 500°C/5h to yield approx. 15 g of CeO2/SiO2 support.

2. Preparation of Vanadyloxalate Solution

Ammonium metavanadate was dissolved in a 1M oxalic acid solution until a concentration of 12.26 % V2O5 was reached.

3. Preparation of Cerium Vanadate (CeVO4)

6.62 g Ammonium meta vanadate (V2O5 content: 77.7 %) was added to 200 mL of deionised water and the mixture obtained was heated up to 80°C. A clear solution was obtained which was treated with 16.8 g of cerium nitrate solution (CeO2: 39.6%). The pH of the mixture obtained was increased to 7.25 by addition of 24% ammonia solution. The mixture obtained was stirred for 20 minutes, filtered, and washed with deionised water followed by calcination at 850°C/2h in order to yield approx. 10 g of CeVO4. The structure was confirmed by X-ray analysis.

Experiment 1 : **Composition out of TiO2-WO3-SiO2-CeO2 and Vanadyl Oxalate**

0.5g of CeO2/SiO2 prepared according to Procedure 1 were suspended in 50 mL of deionised water. 8.1g of TiO2 (Anatase structure obtained from TRONOX Germany) were

suspended in 150 mL of deionised water and to the suspension obtained was added 0.9 g of WO3 and the mixture obtained was stirred. After few minutes of stirring the TiO2 and WO3 suspension was poured into CeO2/SiO2 suspension and the mixture obtained was stirred. From the mixture solvent was evaporated to dryness and the evaporation residue was calcined at 500°C/3h.

The support material thus obtained was impregnated with 4.08 g of Vanadyloxalate solution (corresponding to 0.5g of V2O5) by suspending the mixed oxide (TiO2-WO3-CeO2-SiO2) in Vanadyloxalate solution, stirring and evaporating solvent from the mixture to dryness and calcining the mixture at 700°C/ 5h.

The calcined material was characterised by X-ray diffraction as shown in Graph 1.

However, in Graph 1, no clear peaks which correspond to CeVO4 could be identified. Thus, the process does not result in CeVO4 as suggested in the Office Action.

Experiment 2: **Composition out of Experiment 1 blended with CeVO4**

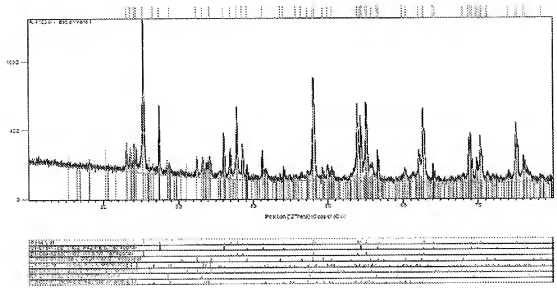
To 4.58 g of a material yielded according to Procedure 1 there was blended in 0.42 g of CeVO4 by intimate (physical) mixing of the 2 compounds.

The yielded material was subjected to XRD analysis as shown in Graph 2.

Peaks at 2 Theta degrees at 18.12, 24.03, 49.24, 77.3 which correspond to CeVO4 could be clearly identified, as shown in Graph 2.

Therefore, had Experiment 1 resulted in CeVO4, the XRD analysis would have shown the peaks related to CeVO4. However, when CeVO4 was affirmatively added, as in Experiment 2, the CeVO4 peaks were present. Had CeVO4 been present from Experiment 1, the resulting XRD would have been similar to Graph 2. Since Graph 1 did not show any CeVO4 peaks, the Experiment 1, which was a simulation of combining Kleemann and Reddy, does not result in producing CeVO4 as suggested in the Office Action. Thus, combining Kleemann and Reddy does not necessarily result in the presently claimed invention.

Graph 1 – XRD spectra corresponding to material prepared according to Experiment 1



Graph 2 – XRD spectra corresponding to material according to Experiment 2